

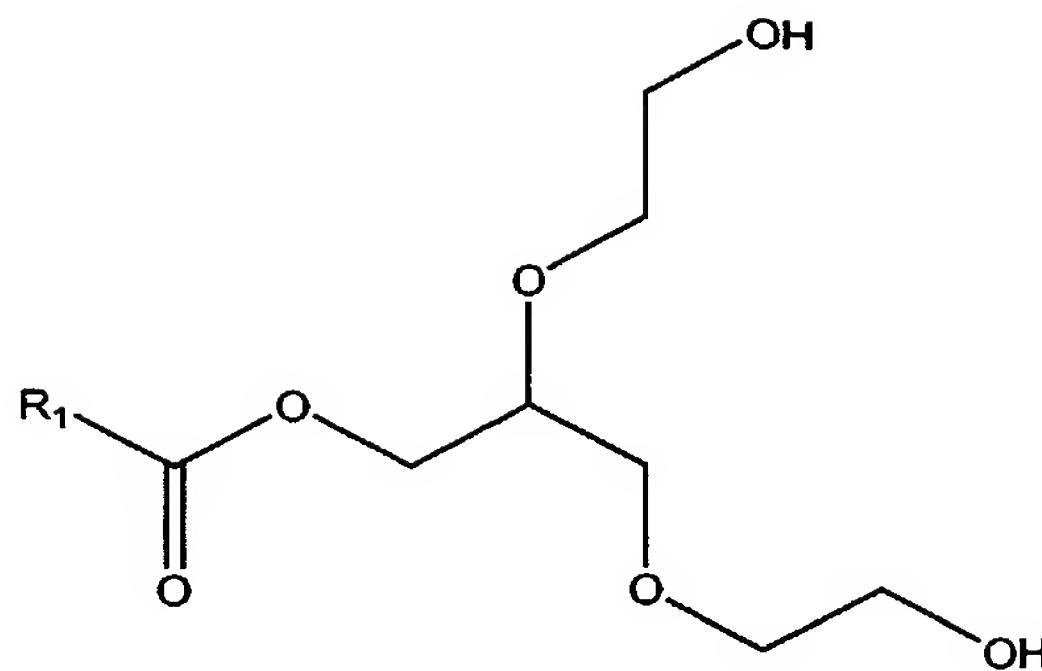
## CLAIMS

1. A water-based composition for treating a metal, comprising a treatment agent selected from an alkanethiol, alkyl thioglycollate, dialkyl sulfide or dialkyl disulfide 5 and at least one of an amphoteric, nonionic or cationic surfactant in a concentration that is effective to solubilise the treatment agent.
2. The composition of claim 1, wherein the treatment agent is hexadecyl mercaptan.
- 10 3. The composition of claim 1 or 2, comprising non-ionic relatively hydrophobic surfactant.
4. The composition of claim 3, wherein the surfactant comprises a single C<sub>10</sub>-C<sub>24</sub> alkyl or alkenyl hydrophobic moiety and a single polar non-ionic headgroup.
- 15 5. The composition of claim 3, wherein the surfactant comprises a single C<sub>12</sub>-C<sub>18</sub> alkyl or alkenyl hydrophobic moiety and a single polar non-ionic headgroup.
- 20 6. The composition of claim 3, wherein the surfactant comprises a compound of the formula

$$R_1CONH_m(CH_2CH_2OH)_n$$

wherein R<sub>1</sub> represents C<sub>10</sub>-C<sub>24</sub> alkyl or alkenyl, m is 0 or 1 and n is 1 or 2.

- 25 7. The composition of claim 3, wherein the surfactant comprises cocamide DEA.
8. The composition of claim 3, wherein the surfactant comprises an ethoxylated fatty acid monoglyceride of the formula:



wherein R<sub>1</sub> represents C<sub>10</sub>-C<sub>24</sub> alkyl or alkenyl.

5 9. The composition of claim 8, wherein the surfactant is a compound in which R1 represents C<sub>12</sub>-C<sub>18</sub> alkyl or alkenyl.

10. The composition of claim 3, wherein the surfactant is glycereth-2-cocoate.

10 11. The composition of claim 3, wherein the surfactant is a sulfoxide surfactant, a phosphine oxide surfactant, an amine oxide surfactant, a polyethylene oxide condensate of an alkyl phenol, a condensation product of an aliphatic alcohol with ethylene oxide or a condensation product of ethylene oxide with the product resulting from the reaction of propylene oxide and ethylene diamine.

15 12. The composition of any of claims 3-11, comprising 0.5-10 wt % of the relatively hydrophobic surfactant.

20 13. The composition of any of claims 3-11, comprising 1-6 wt % of the relatively hydrophobic surfactant.

14. The composition of any of claims 3-11, comprising 2-5 wt % of the relatively hydrophobic surfactant.

15. The composition of any preceding claim, further comprising a polyol.
16. The composition of claim 15, comprising 0.5-10 wt % of the polyol.
- 5 17. The composition of claim 15, comprising 1-8 wt % of the polyol.
18. The composition of claim 15, comprising 1-5 wt % of the polyol.
19. The composition of any of claims 15-18, wherein the polyol is glycerol.
- 10 20. The composition of any preceding claim, further comprising an anionic surfactant.
21. The composition of claim 20, wherein the anionic surfactant is of the formula RO-(CH<sub>2</sub>CH<sub>2</sub>)<sub>n</sub>SO<sub>3</sub>M wherein R represents C<sub>10</sub>-C<sub>18</sub> alkyl, n is 2-6 and M represents a monovalent cation.
22. The composition of claim 20, wherein the anionic surfactant is a monovalent cation salt of laureth sulfate.
- 20 23. The composition of any of claims 20-22, wherein the amount of anionic surfactant (solids) is 0.1-15 wt%.
24. The composition of any of claims 20-22, wherein the amount of anionic surfactant (solids) is 0.3-10 wt%.
- 25 25. The composition of any of claims 20-22, wherein the amount of anionic surfactant (solids) is 0.5-1 wt%.
- 30 26. The composition of any preceding claim, further comprising a zwitterionic surfactant selected from betaine surfactants, imidazoline-based surfactants, aminoalkanoate surfactants and iminodialkanoate surfactants.

27. The composition of claim 26, comprising cocamidopropyl betaine.
28. The composition of claim 26 or 27, wherein the zwitterionic surfactant is  
5 present in an amount of 0.3-6 wt%.
29. The composition of claim 26 or 27, wherein the zwitterionic surfactant is  
present in an amount of 0.6-3 wt%.
- 10 30. The composition of claim 26 or 27, wherein the zwitterionic surfactant is  
present in an amount of 0.9-1.5 wt%.
- 15 31. A composition according to any preceding claim comprising treatment agent  
in an amount of 0.1-5 wt%.
32. A composition according to any preceding claim comprising treatment agent  
in an amount of 0.5-2 wt%.
- 20 33. A composition according to any preceding claim comprising treatment agent  
in an amount of about 1 wt%.
34. A composition according to any preceding claim, further comprising a salt of  
a strong base with a strong mineral acid.
- 25 35. The composition of claim 34, wherein the salt is sodium chloride or sodium  
sulfate.
36. The composition of any preceding claim, comprising 0.1-3 wt% of said salt.
37. The composition of any preceding claim, comprising 0.5-2 wt% of said salt.
- 30 38. The composition of any preceding claim, comprising about 1 wt% of said  
salt.

39. The composition of any preceding claim, which is a polishing dip and further comprises an acid and a thiourea.

5 40. The composition of any of claims 1-38, which is a cream or paste polish further comprising a solid polishing medium.

41. The composition of claim 40, wherein the polishing medium is precipitated chalk, infusorial earth, silica or  $\gamma$ -alumina.

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42. Use of the composition of any of claims 1-41 for the treatment of a silver-copper alloy, a silver-copper-germanium alloy, copper, brass or nickel.

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43. A method of manufacturing a water-based composition comprising a treatment agent selected from an alkanethiol, alkyl thioglycollate, dialkyl sulfide or dialkyl disulfide and at least one of an amphoteric, nonionic or cationic surfactant, which method comprises:

20 mixing the treatment agent with at least one surfactant which is a non-ionic relatively hydrophobic surfactant and with an anionic and a zwitterionic surface active agent which may be present at the time of mixing or may be added subsequently, the surface active agents being at concentrations effective to solubilise the treatment agent, and optionally further diluting the resulting solution or dispersion with water.

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44. The method of claim 43, wherein the treatment agent and the surfactant are mixed with a salt of a strong alkali with a strong mineral acid before dilution with water.

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45. The method of claim 43 or 44, wherein the pH of the diluted mixture is adjusted to 4-8 using a weak organic acid.

46. The method of claim 43 or 44, wherein the pH of the diluted mixture is adjusted to 6-7 using a weak organic acid.

47. The method of claim 45 or 46, wherein the weak organic acid is citric acid.